U.S. Department of Transportation
Federal Railroad Administration

OFFICE OF RESEARCH & DEVELOPMENT

An Evaluative R&D Framework for Influencing Safety Culture Change in the U.S. Rail Industry

Safety Culture: Enhancing Transportation Safety
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Safety Culture in U.S. Railroad Industry

Research and Evaluation Strategy, 2001

- Identify, develop, and implement innovative safety culture pilot projects in U.S. railroad industry
- Develop safety culture interventions applicable across different organizations and environments
- *Evaluate utilization, impact, and effectiveness of pilot projects*
- Where successful, support broad-scale adoption and implementation across industry

Develop a "business case" for safety culture in the railroad industry

Alternative Approaches: A Historical View

Approach		Carriers	Start
Participative Safety Rules Revision		ACBL, CSXT, KCS, CN-IC	1999
ISROP: Investigation of Safety Related Occurrences Protocol		Canadian Pacific	2003
Clear Signal for Action (CSA) • Peer-to-Peer feedback • Continuous Improvement • Safety Leadership	**EAGLES**: Employee Alliance for Great Levels of Excellence in Safety	Amtrak	2001
	CAB: Changing At-Risk Behavior	Union Pacific	2005
	STEEL: Safety Through Employees Exercising Leadership	Union Pacific	2006
C^{3}RS: **Confidential Close Call Reporting System**		Union Pacific Canadian Pacific New Jersey Transit Amtrak	2007 2008 2009 2011

Safety Culture in U.S. Railroad Industry

Safety Culture Impact Evaluations Empirical Findings

Approach*	Functions	Outcomes
Participative Safety Rules Revision	All Operating	**30%** reduction in reportable injuries Drop in liability claims
Root-Cause Analysis Problem Solving	Mechanical	**50%** drop in injury rates (all injuries)
Clear Signal for Action (CSA) • ***Peer-to-Peer Feedback*** • ***Continuous Improvement*** • ***Safety Leadership***	*Station Services*	***76%** drop in injury rates* ***71%** drop in reportable injuries*
	Road Crews	***79%** drop in L.E. decertification rates* ***81%** drop in derailments*
	Yard Crews	***65%** drop in yard-derailment rates*
Confidential Close Call Reporting System (C^3RS)	Road & Yard Crews	**31%** reduction in derailments at one site **90%** drop in discipline cases **48%** drop in excess-speed reports

*These programs exemplify team and peer-to-peer coaching/feedback methods

POLICY INFLUENCES

Safety Culture Rail Industry Policy Influences

Organization	Policy Changes
Union Pacific	"Total Safety Culture" Program
Toronto Transit	System-wide safety culture change
Amtrak	"Safe to Safer" Program Joined C3RS
Canadian Pacific	Re-committed to ISROP
New Jersey	Joined C3RS
BNSF	Safety Leadership Development "Approaching Others"

**Body of evidence suggests R&D pilots strongly influenced industry wide changes.*

Policy Influence at U.S. Congress

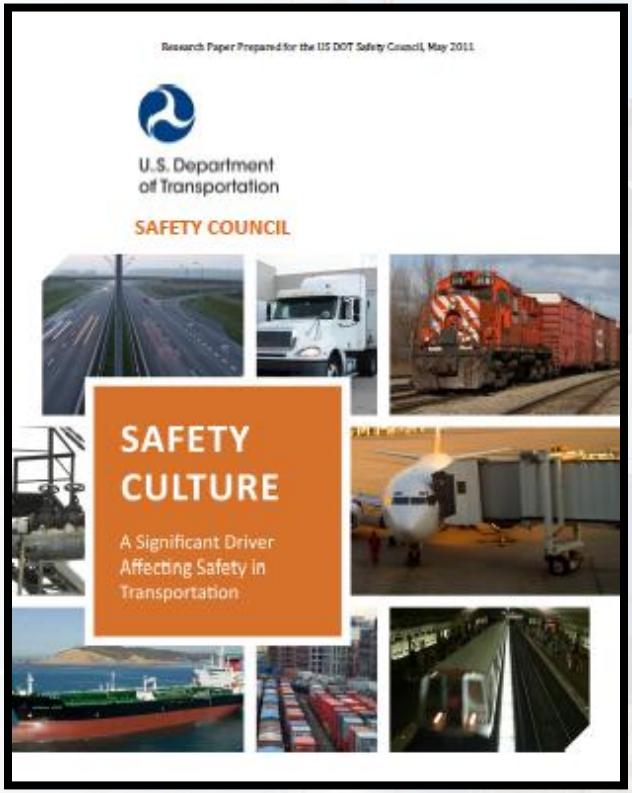
110TH CONGRESS
of the United States of America
H. R. 2095
Rail Safety Improvement Act of 2008

‘‘§ 20156. Railroad safety risk reduction program
‘‘(1) PROGRAM REQUIREMENT.— ... the Secretary of Transportation . . . shall require each railroad carrier ... ‘‘(A) to develop a railroad safety risk reduction program under subsection (d) that **systematically evaluates** railroad safety risks on its system and manages those risks . . .

‘‘(2) **RELIANCE ON PILOT PROGRAM**.—The Secretary may **conduct behavior-based safety and other research, including pilot programs**, before promulgating regulations under this subsection and thereafter. The Secretary shall use any information and experience gathered through such research and pilot programs under this subsection in developing regulations under this section.”

Policy Influence at U.S. DOT Safety Council

- **Safety Culture Action Team**
  - Safety Culture Research Paper
  - DOT Safety Policy Statement




POLICY STATEMENT ON SAFETY 2011

In carrying out our transportation mission, safety is our highest priority. Every life is precious, and we must strive to ensure the safety of every user of our transportation systems, as well as all who are affected by these systems. Injuries and loss of life are unacceptable in the efficient and effective transportation of goods and people, and we must take every practical action to prevent these tragedies from happening.

The American public has entrusted us with the responsibility of securing the safety of our transportation systems. We will hold ourselves accountable, measure our performance, and continuously act to make our transportation systems safer. We expect no less from our transportation partners. Our guidance, oversight, and regulatory decisions will emphasize safety and be timely, fair, reasonable, and necessary. We can and should be a change agent by exemplifying and promoting a safety culture in which the values, actions, and behaviors of our employees reflect this priority.

Safety begins within our own Department, and the ability to carry out our statutory responsibilities is directly tied to the health and well-being of our workforce. The safety of our own employees is paramount. Each of our employees should be provided with a safe working environment, and know how to respond to emergencies and avoid unnecessary risks. We also expect supervisors and managers to provide our employees with an environment that promotes the open sharing of safety concerns, without fear of reprisal, as well as processes to ensure these concerns are addressed. It is the responsibility of all DOT employees to conduct themselves in a way that does not pose unnecessary risks, or put themselves or others in danger.

Everyone within the Department is expected to exercise effective leadership in support of this policy, which shall be posted throughout the Department, clearly visible and accessible to all employees.

Ray LaHood

U.S. Department of Transportation
Federal Railroad Administration

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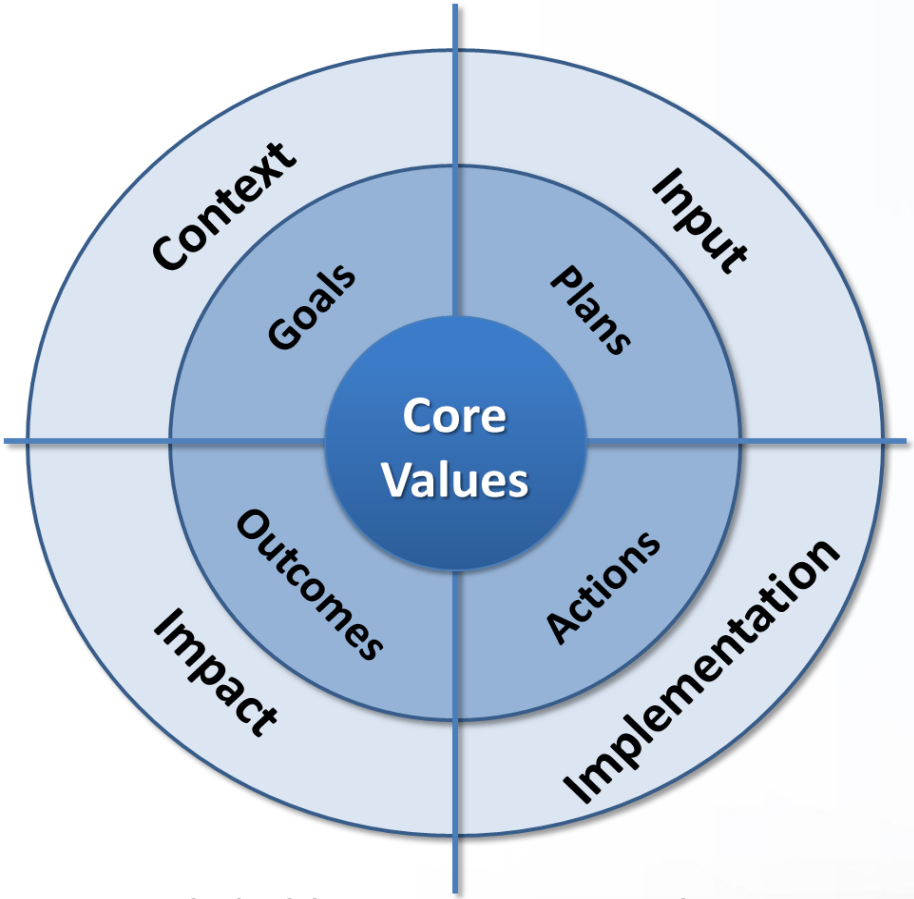
HOW DID WE GET THERE?

CIPP Evaluation Model:
(Context, Input, Process, Product)



Stakeholder engagement is key

Types of Evaluation

- Context
- Input

- Implementation
- Impact

Daniel L. Stufflebeam's adaptation of his CIPP Evaluation Model framework for use in guiding program evaluations of the Federal Railroad Administration's Office of Research and Development. For additional information, see Stufflebeam, D.L. (2000). The CIPP model for evaluation. In D.L. Stufflebeam, G. F. Madaus, & T. Kellaghan, (Eds.), in Evaluation models (2nd ed.). (Chapter 16). Boston: Kluwer Academic Publishers.

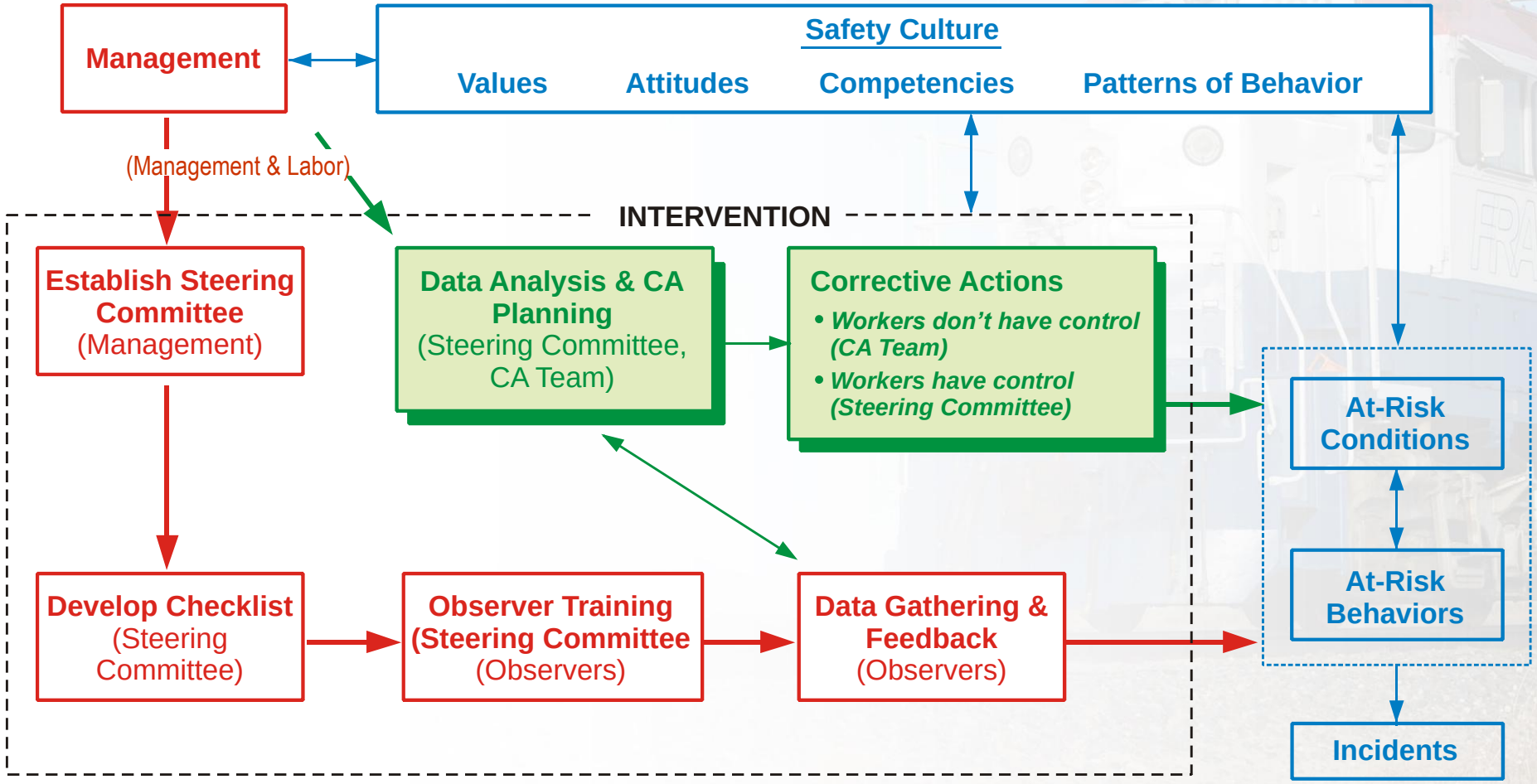
Context Evaluation (circa 1990's): Safety Culture in U.S. Railroad Industry

Militaristic safety culture

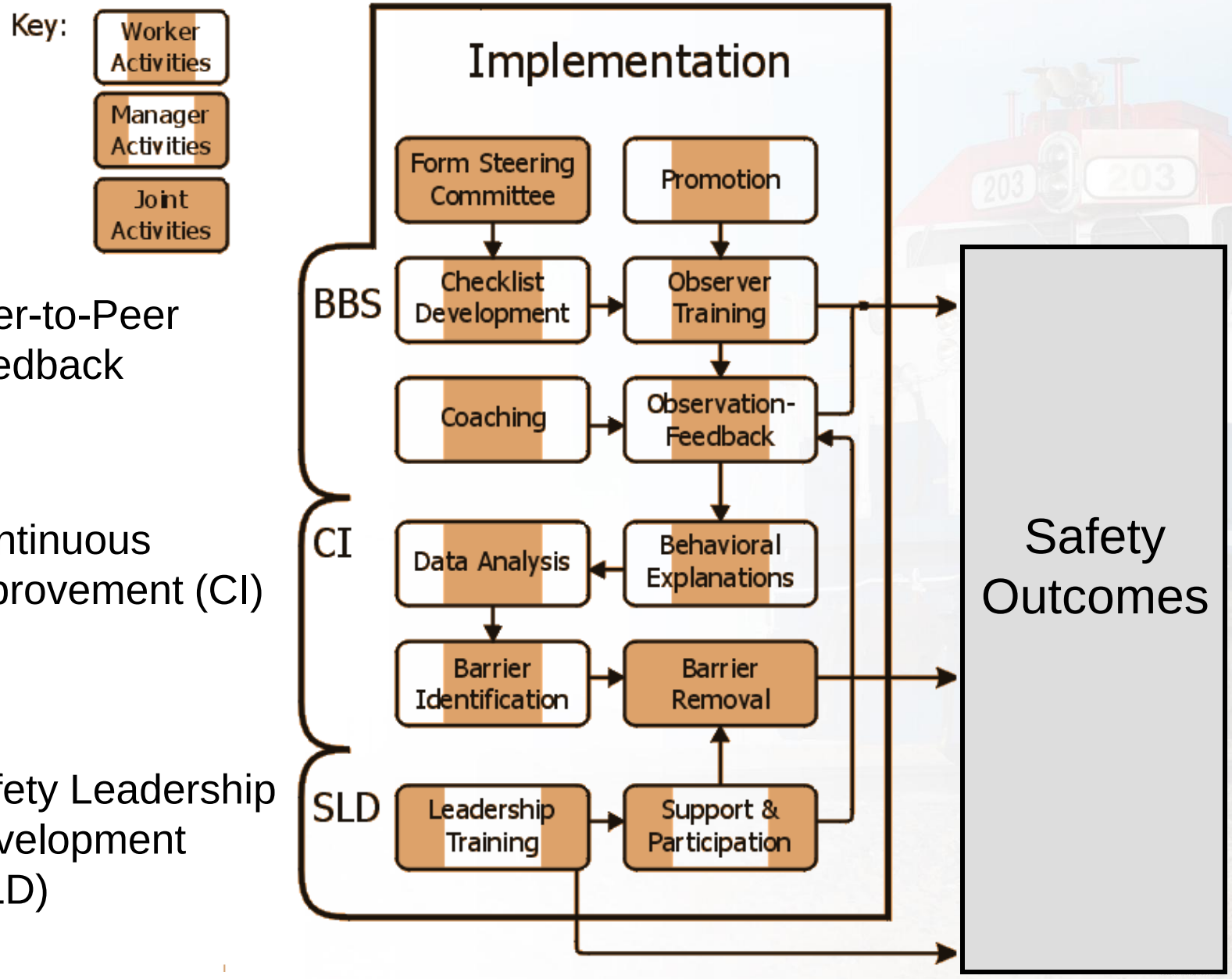
- Adversarial labor/management relations
- Negative safety communications
- Organizational factors often ignored
- Blame-based, rule-driven reactionary system
  * Safety rules, regulations, legal structure *
- Punitive disciplinary system

Input Evaluation: Program Design and Partnership Commitment to Change

Clear Signal for Action (CSA) Theory of Change



Implementation Evaluation

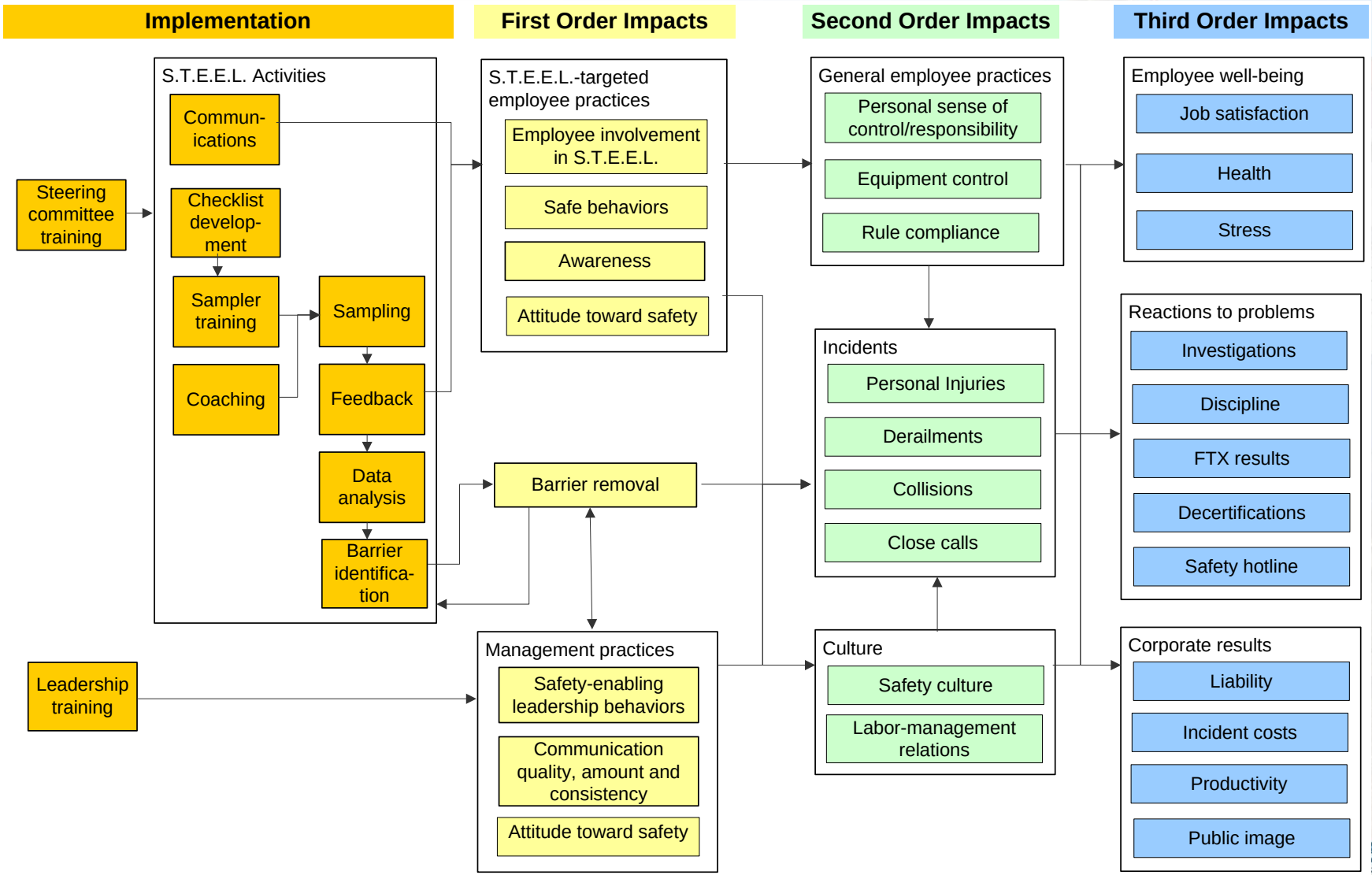


Peer-to-Peer Feedback

Continuous Improvement (CI)

Safety Leadership Development (SLD)

Impact Evaluation: Expected changes and possible metrics (Union Pacific example)



Program Evaluation Standards: Guiding Principles for Conducting Evaluations

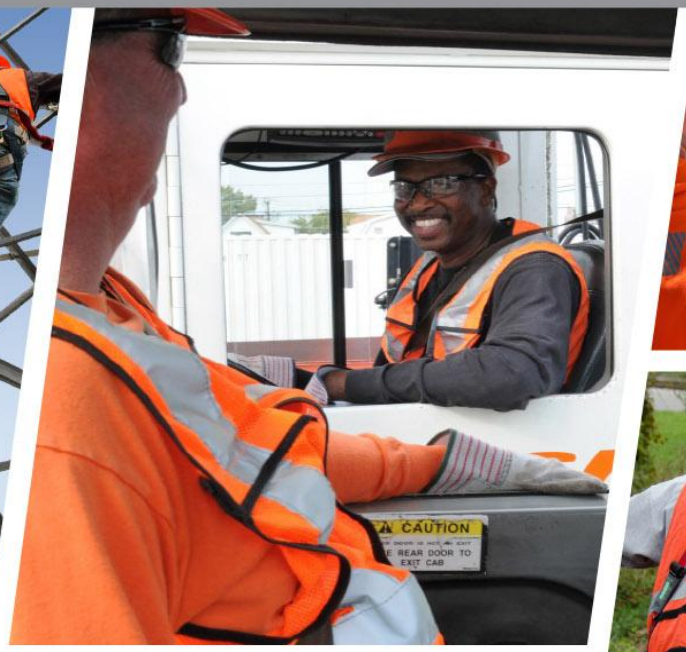
- Utility (useful)
- Feasibility (practical)
- Propriety (ethical)
- Accuracy (valid)
- Accountability (professional)

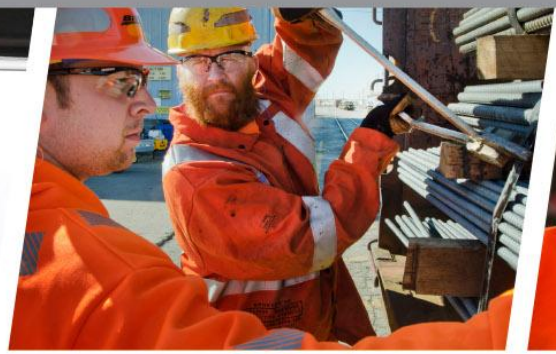
Note: The Program Evaluation Standards were developed by the Joint Committee on Standards for Educational Evaluation and have been accredited by the American National Standards Institute (ANSI).

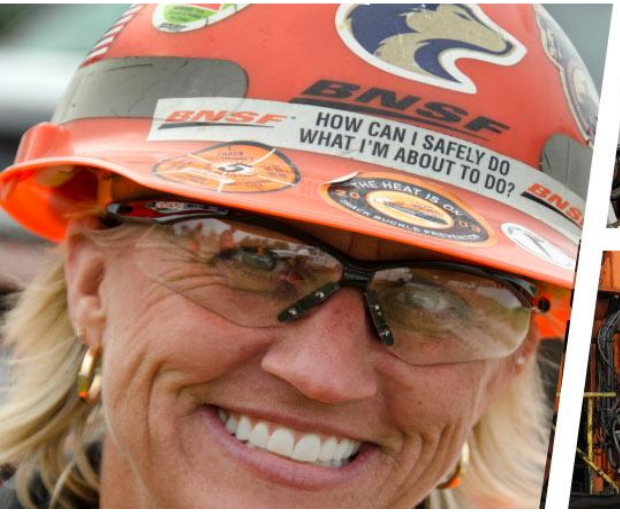
Evaluation as a Key Strategy Tool

- Ask questions that matter.
  - → About processes, products, programs, policies, and impacts
  - → Then develop appropriate and rigorous methods to answer them.
- Measure the extent to which, and ways, programs goals are being met.
  - → What's working, and why, or why not?
- Use to refine program strategy, design and implementation.
  - → Inform others about lessons learned, progress, and program impacts.
- Improve likelihood of success with:
  - Intended users
  - Intended uses
  - Outcomes and impacts
  - Unanticipated (positive) outcomes

Approaching Others About Safety







Extra Slides

Evaluation Standards

*Guiding principles for conducting evaluations

Utility (useful)	Feasibility (practical)	Propriety (ethical)	Accuracy (valid)	Evaluation Accountability (professional)
• Evaluator Credibility • Attention to Stakeholders • Negotiated Purposes • Explicit Values • Relevant Information • Meaningful Processes & Products • Timely & Appropriate Reporting • Concern for Consequences & Influence	• Project Management • Practical Procedures • Contextual Validity • Resource Use	• Responsive & Inclusive Orientation • Formal Agreements • Human Rights & Respect • Clarity & Fairness • Transparency & Disclosure • Conflicts of Interest • Fiscal Responsibility	• Justified conclusions & decisions • Valid Information • Reliable Information • Explicit Program & Context Description • Information Management • Sound Design & Analyses • Explicit Evaluation Reasoning • Communication & Reporting	• Evaluation Documentation • Internal Metaevaluation • External Metaevaluation

Note: The Program Evaluation Standards were developed by the Joint Committee on Educational Evaluation and have been accredited by the American National Standards Institute (ANSI).

Evaluation Resources

American Evaluation Association (http://www.eval.org)

- 3000 members in 2001
- over 7700 members today
- all 50 states
- over 60 countries
- $95/year membership, includes
  - American Journal of Evaluation
  - New Directions in Evaluation
  - online access to full journal articles

Evaluation Resources

- Affiliate Evaluation Associations
  - Washington Research and Evaluation Network (WREN)
  - Federal Evaluator's Network
- Evaluation Journals
  - American Journal of Evaluation (AJE)
  - New Directions for Evaluation (NDE)
  - Evaluation Review
  - Evaluation and the Health Professions
- The Evaluator's Institute (http://tei.gwu.edu/courses_dc.htm)
  - George Washington University
- The Evaluation Center (http://www.wmich.edu/evalctr/)
  - Western Michigan University

Common Elements of Successful Safety Culture Change

- Commitment from all key stakeholders
- Voluntary, confidential/anonymous, non-punitive participation
- Systematic and objective data gathering, analysis, and reporting
- Problem solving, barrier identification and removal, corrective action process
- Long-term sustaining mechanisms

Sample Metrics: Organizational Culture & Safety Performance

- Employee practices
  - Observed at-risk behaviors
  - Forced-choice survey (e.g., switching practices)
  - Open-ended interviews
- Management practices & systemic improvements
  - Open-ended interviews
  - Facility improvements
  - Policy changes

Sample Metrics: Organizational Culture & Safety Performance (continued)

- Safety Culture
  - Forced-choice survey scales
    - (e.g., management-labor relations, equity, safety climate)
  - Open-ended interviews
- Safety Occurrences
  - Injuries
  - Accidents/incidents (e.g., derailments)
  - Engineer de-certifications
  - Rule violations (excessive speed)

Sample Metrics: Organizational Culture & Safety Performance (continued)

- Operational Performance
  - Velocity
  - Capacity
  - Dwell time
  - Customer service
- Administrative
  - Union grievances
  - Accident investigations
  - Absenteeism
  - Liability claims

Safety Culture Rail Industry Policy Influences: ISROP Case Study – System Wide Impact

- Corrective actions were not just focused on the individuals involved in the event
- ISROP results led to system-wide improvements
  - Safety Alert issued across company in 2004
  - Updated jacking guidelines prepared in 2006

Mechanical Services 008-04

Safety Alert

Incident – On November 29, 2004, the B-end of loaded boxcar CP 214873 was being jacked to change wheelset #2. The jack was placed under the first large cross-member (cross-bearer) inboard of the truck. When the wheelset had been changed and the jack was being operated to lower the car onto the truck, the car suddenly dropped approximately 6" to 12". One carman was struck on his hard hat by the cross-over platform as the car dropped. He then fell to the ground injuring his left elbow.

Investigation – Inspection of the cross-bearer revealed that it had crushed at the locations of the jacks. It has been common practice to jack cars such as these at the cross-bearers because the jacking pads may be inadequate to support the weight of the loaded car. Many 70-ton boxcars have been upgraded to 100-ton capacity but jacking pads were not reinforced.

Corrective Action – Loaded boxcars should not be jacked at the cross-members. Loaded boxcars which have been upgraded from 70-ton to 100-ton capacity should not be jacked at the jacking pads if the pads have not been reinforced. These upgraded cars, when loaded, should only be lifted with a crane following approved procedures.

CPR will implement a program to reinforce the jacking pads of all affected cars. CPR cars known to require this work are in series CPAA 211000 - 249 and CP 214000 - 876. Other cars, both CPR and foreign, may be affected. Assume that the jacking pads of any loaded 100-ton boxcar are inadequate until it can be confirmed otherwise.

More Information – CPR Equipment Engineering can advise if a car has been upgraded from 70-ton to 100-ton and if jacking pads have been reinforced.

▲ Do not jack cross-bearers

▲ Crushed cross-bearer

During any lifting or jacking situation, safety of personnel is the first and foremost concern and all appropriate caution should be taken.

Dave Heyler
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Mechanical Services

JACKING GUIDELINES

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